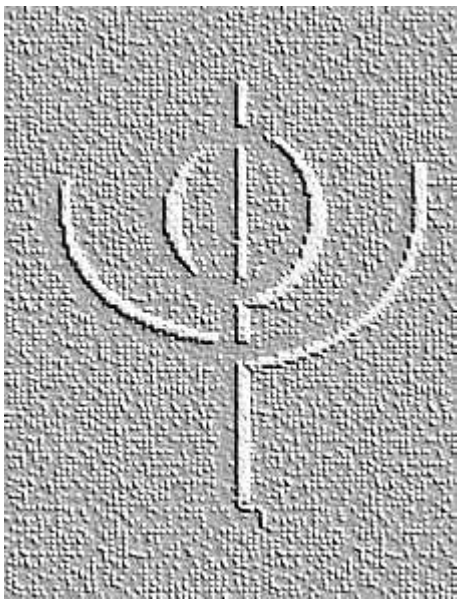
Laboratorio de Investigaciones Sensoriales (LIS)
CONICET



INFORME ANUAL XLII- 2009

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PERSONAL

Investigadores del CONICET que participan en PROYECTOS que se desarrollan en el LIS

CALVIÑO Amalia M., Farmacéutica, Dra. en Bioquímica

GUIRAO Miguelina, Prof. Filosofía, Dra. en Psicología Experimental.

GURLEKIAN Jorge A., Ing. Electrónico, Responsable del LIS.

TOLEDO Guillermo, Lingüista, Dr. en Filosofía y Letras.

TORRES Humberto, BioIngeniero, Dr. en Ingeniería.

Becarios

ELISEI Natalia, Fonoaudiologa, Becaria CONICET, Tesista de Doctorado UBA

EVIN Diego, Bioingenierio, Becario FONCYT, Tesista de Doctorado UBA

TRIPODI Mónica, Lingüista. Tesista de Doctorado.

CECCONELLO Luis, Fonoaudiólogo, Tesista de Doctorado UMSA

YANAGIDA Reina, Profesora de Letras, Tesista de Doctorado (Tokio)

PROYECTO

Mincyt-BMBF: **EXTRACCIÓN Y MODELACIÓN DE LOS PARÁMETROS PROSÓDICOS PARA EL ANÁLISIS, SÍNTESIS Y RECONOCIMIENTO DEL HABLA.**
Prosodische Parameterextraktion und Modellierung für die Sprachanalyse, -synthese und -erkennung

Directores: Jorge A. Gurlekian y Hansjörg Mixdorff. Período: 2009-2011. Laboratorio de Investigaciones Sensoriales y Department of Computer Sciences and Media. Institución de la que depende la Unidad de Ejecución: CONICET y TFH-Berlin University of Applied Sciences.

Este proyecto se integra con el proyecto Nombre: PAE Nro: 37122, PID 2007. Nro. 094. FONCYT. Desarrollo de un sistema de conversión de Texto a Habla. Director: Gurlekian, J. A. Período: 2009-2011. Unidad de Ejecución: Laboratorio de Investigaciones Sensoriales.

For many years Mixdorff and Gurlekian have been collaborators of Prof. Hiroya Fujisaki (Japan), the developer of the Fujisaki model for Japanese, and had professional contacts from 1995 on when Mixdorff assisted Fujisaki in the analysis of Spanish speech data provided by Gurlekian. More recent exchanges occurred during the last few months when Mixdorff helped in reviewing a journal publication by Gurlekian describing their work group's most recent achievements employing the Fujisaki model for prosody generation in an Argentinean Spanish speech synthesis systems. Owing to the common interest of the two researchers this project proposal is meant to establish a direct collaboration joining the respective forces. Pfitzinger and Mixdorff have been cooperating in prosody research since their first joint publication in 2004

SEMINARIOS

En el LIS
Prof. Hansjórg Mixdorf
Director Division/Institute Department of Computer University of Applied Sciences and Media de la TFH Berlin dictó un seminario sobre *Intonation Patterns of German -Model-based Quantitative Analysis and Synthesis of F0-Contours*, el 30 de Octubre, de 2009.

Ing. Hartmut Pfitzinger
Investigador de la Researcher Division/Institute Institut für Phonetik und Digitale Sprachverarbeitung Christian-Albrechts-Universität dictó un seminario sobre *Segmental effects on the prosody of voice quality*, el 30 de Octubre de 2009.

INTERCAMBIO CIENTIFICO

Prof. Hansjórg Mixdorf

EL Prof. Mixdorf Director Division/Institute Department of Computer University of Applied Sciences and Media de la TFH Berlin realizó una visita de intercambio al LIS para colaborar en el Proyecto conjunto MINCYT-BMBF: Extracción y modelación de los parámetros prosódicos para el análisis, síntesis y reconocimiento del habla que codirige con el Ing. Jorge A. Gurlekian Sciences -
Ver Seminarios

Ing. Hartmut Pfitzinger

EL Ing. Pfitzinger del Institute Institut für Phonetik und Digitale
Sprachverarbeitung de la Christian-Albrechts-Universität, Kiel, Germany
se trasladó al LIS para colaborar en el el Proyecto conjunto MINCYT-BMBF.

Dr. Ingo Feldhausen
Dra. Andrea Peskova
Collaborative Research Center: Multilingualism Universidad de Hamburgo
Prof. Dr. Christoph Gabriel
Institut für Romanistik Hamburg

Visitaron el LIS para intercambiar experiencias sobre el proyecto AMPER(Atlas Multimedia del Espacio Romance) -Argentina y su aplicación al estudio de la entonación en el español rioplatense.

Ing. Jorge A. Gurlekian
BioIng. Humberto M. Torres

Visitaron en Alemania el Department of Computer University of Applied Sciences and Media de la TFH de Berlin que dirige el Prof. Hansjórg Mixdorf y el Laboratory of Acoustics and Speech Communication, de la Dresden University of Technology de Dresden que dirige el Prof. Dr. Rüdiger Hoffmann**.**

PROYECTO

CONICET PIP N° 5897/06: Análisis de las sensaciones de dulce, agrio y amargo en soluciones puras y mezcladas en medio acuoso y alcohólico.
Dirección: Miguelina Guirao
Codirección: .Amalia Mirta Calviño,

Asistentes de Investigación
Dra. Romina F. Argañaraz, Medica ORL Hospital Nacional de Pediatría Juan P. Garrahan, Buenos Aires
Lic. Roxana, Agnesio Licenciada en Nutrición.
Ezequiel Greco Driano Estudiante ultimo año Facultad de Medicina UBA

TRABAJOS TERMINADOS

Guirao, M, Greco Drianó. E., Evin, D. A and Calviño A. *Variations in the perceived sourness of citric acid mixed with ethanol*.
Ver texto del resumen e introducción en Pág. 7

Guirao, M., Greco Drianó, E., Evin, D.A. and Calviño A. *Bitter taste modifications by mixing caffeine with ethanol.*
Ver texto del resumen e introducción en Pág. 8

PUBLICACIONES

ARTICULOS

Guirao, M, Greco Drianó. E., Trastornos del olfato: interacciones trigeminales y gustativas. FASO *(Revista de la Federación Argentina de Sociedades de Otorrinolaringología).* Año 16, 1, 2009, 57-62.
www.faso.org.ar/revista.asp
http://www.lis.secyt.gov.ar/index.php?l=es

DIVULGACION

Artículo periodístico *Entrevista a Miguelina Guirao*
Tema: *Ensayan pruebas para detectar trastornos de olfato*
Periodista Constanza Dorbez *Agencia CyTA-Instituto Leloir*
Publicado por Universidad de Buenos Aires [http://www.agenciacyta.com.ar]
Este artículo fue reproducido con modificaciones en los siguientes medios:
-Fundación Vida y Esperanza. Julio 1, 2009.
-El fisgón digital. .DIGITAL.COM Hojas de arte & ciencia Julio 14, 2009.
-Paralelo32.com.ar 37º aniversario. Noviembre 2009.
Ver texto en [http://www.lis.secyt.gov.ar/referencias/transtornosOlfato.pdf **]**

Miguelina Guirao *Los Sentidos*
Multimedia FUC Universidad del Cine, Octubre 8, 2009

Disponible en [http://multimediafuc.wordpress.com/apuntes-teoricos-2009/proyectos/sentidos/].

Ver texto en [http://www.lis.secyt.gov.ar/referencias/FUC.pdf **]**

PROYECTO

Desarrollo de pruebas para detectar deterioros de los sentidos químicos: olfato, gusto y sistema trigeminal
Directora: Dra. Miguelina Guirao
Ver Informe LIS 2007 en http://www.lis.secyt.gov.ar/memorias.php
Sobre la base de los proyectos de investigación en sentidos químicos se han ofrecido servicios de asesoría para la aplicación de pruebas de detección, discriminación e identificación de gustos y olores algunas de las cuales se han desarrollado en el LIS. Las pruebas fueron aplicadas (ad FASO *(Revista de la Federación Argentina de Sociedades de Otorrinolaringología).* Año 16, 1, 2009, 57-62.
www.faso.org.ar/revista.asp

DOCENCIA

Dictado de Curso de Postgrado
Tema Mecanismos sensoperceptuales del sistema gustativo
Dra. Miguelina Guirao
Para la Carrera de Especialistas en ORL Facultad de Medicina UBA
ASOCIACION MEDICA ARGENTINA Capital Federal
12 de Septiembre 2009.

Variations in the Perceived Sourness of Citric Acid Mixed with Ethanol

MIGUELINA GUIRAO, EZEQUIEL J. GRECO DRIANO, DIEGO EVIN

Laboratorio de Investigaciones Sensoriales (LIS) CONICET

Instituto de Neurociencias, Hospital de Clínicas, UBA

(1120) Buenos Aires, Argentina

AMALIA CALVIÑO

Cátedra de Fisiología, Facultad de Farmacia y Bioquímica, UBA
IQUIMEFA, CONICET, (1113) Buenos Aires, Argentina.

Corresponding author email: mguirao@fmed.uba.ar

Running title: SOURNESS CITRIC ACID MIXED WITH ETHANOL

ABSTRACT

Intensive and temporal changes produced in the sour taste when ethanol is added to citric acid were evaluated by Magnitude Estimation-Converging Limits and Time-Intensity methods. Consistent results were obtained with the two psychophysical methods. Power functions generated with mixed samples were flatter than those obtained with acid alone. The presence of ethanol shortened the range of numerical responses. The effects changed with citric acid concentration and ethanol levels. Kinetic parameters as duration, area under the curve and average intensity increased when weak mixtures were tasted. With moderate acid the levels of ethanol made a difference. The three parameters decreased with weak ethanolic mixtures but were enhanced when higher gradients of ethanol were added. At the stronger citric acid concentrations the effect was apparently no significant on either intensity or kinetic parameters. In spite of the changes observed mixed samples retained their distinct sourness quality.

Key words: Citric acid ethanol mixtures, sourness intensity, sourness duration, sourness-irritation interaction

INTRODUCTION

Few studies have applied psychophysical methods to the investigation of trigeminal-gustatory interactions and up to now not much agreement has been reached. An important question like the effect of ethanol (EtOH) on basic tastes is not clearly determined today (see Mattes and DiMeglio 2001).

Performing experiments with gustative and trigeminal sample Cowart (1987).concluded that taste and to oral irritation are largely independent and that the observed effects depend mainly on procedural variations.

However, as noted by Delwiche (2004) some tastes contain an irritative component which can add to the perceived intensity of a compound.
In a seminal work Martin and Pangborn (1970) reported a reduction of sourness with the addition of 4% V/V EtOH to citric acid. Also Fischer and Noble (1994) observed that increasing ethanol from 8% to 14% diminished sourness significantly.
Different results were reported by Mattes and DiMeglio (2001), when performing rinses with a nonalcoholic beer (0.5% EtOH V/V) they obtained higher sourness ratings for 0.04% and for 0.12% citric acid solutions

Specifically, human psychophysical studies for sourness in alcoholic vehicles showed complex results. This is probably due to the fact that these chemicals elicit various sensory properties at different concentrations. For example weak solutions of EtOH (4% V/V) are perceived as bitter and sweet, but as concentration increases, a burning sensation is sensed along with the taste qualities. At 10 % V/V it proves to be bitter and also induces sweet and sour responses (Scinska et al 2000). Chemesthetic responses from the trigeminal and vagus nerves like irritation, numbing, temperature, burning and tingling. appear at the higher gradients of EtOH.
All these properties can change with a number of other variables like the lingual locus of stimulation, salivary status, the time of residence of stimuli in the mouth, the PROP status, the gender and age of judges, and others (Martin and Pangborn, 1970, Green, 1988, Mattes and DiMeglio 2001).
EtOH contributed also to the perceived bitterness of tannin oligomers especially at 11–15%, levels typically found in wines (Fontoin *et al*. 2008).

*Ci*tric acid *per se*, stimulates trigeminal sensitivity in addition to sour taste. At high concentrations it induces oral and intranasal irritation as well as bitter taste (Settle *et al*. 1986). When applied to the mucosa of the oral cavity can also elicit pain (Gilmore and Green 1993). It has also been shown that organic acids, even those prototypically considered sour tastants like citric acid, have pronounced astringent impact. (Rubico and McDaniel 1992). Other authors have noted that tactile sensations like dryness, puckering and roughing of oral tissues are similar across acids. (Lawless *et al*. 1996).
Many early psychophysical studies measured sourness applying scalar techniques to quantify single static judgments. However, temporal information is necessary because as pointed out by Dijksterhuis & Piggot, 2001 the evolution of the intensity over time can be different from one product to another.

Typically, T-I parameters as maximum intensity, time to extinct perception (duration) and area under the curve are suitable for examining the functionality of a given sour tastant. Among other parameters, the quotient of area under the curve and duration time is considered the average intensity across the entire temporal course of a taste quality (Calviño et al. 2000). Chemosensory research of sourness complex matrices like beverages and food has proved that the strength or chemestetic impact for a specific acid is a function of both time and stimulus concentration as well as context effects. (Tuorila et al. 1995, Kallithraka et al. 1997, Lugaz et al. 2005).

On the light of those static and dynamic findings the present experiments were undertaken to re-examine the psychophysical changes that occur in the sourness sensation when EtOH is added to citric acid. Therefore, attention was directed to the role played by the ¨trigeminal¨ components of the pair EtOH-citric acid in modulating the intensity and the kinetic properties of the sour responses.

Bitter taste modifications by mixing caffeine with ethanol

MIGUELINA GUIRAO, EZEQUIEL J. GRECO DRIANO, DIEGO EVIN
Laboratorio de Investigaciones Sensoriales (LIS) CONICET
Hospital de Clínicas, UBA (1120) Buenos Aires, Argentina
AMALIA CALVIÑO
Cátedra de Fisiología, Facultad de Farmacia y Bioquímica, UBA
IQUIMEFA, CONICET, (1113) Buenos Aires, Argentina.

Corresponding author email: mguirao@fmed.uba.ar

Abstract
Three series of experiments were performed to examine the effect of ethanol on the taste of caffeine
In the first two series the psychophysical methods of Pair Comparison and Magnitude Estimation-Converging Limits (MECL) were applied to quantify the bitterness intensity of seven concentrations of caffeine tasted alone and mixed with two levels, 8% and 15%, of ethanol
In the third series the Time- Intensity Method (T-I) was used to asses the duration and also the intensity of three caffeine solutions presented singly and mixed with the same two gradation of ethanol.
Results show that the effect on taste intensity depends on the concentration of the two chemicals. Ethanol enhances bitterness ratings at the weak and moderate solutions but no significant change is observed at the strong bitter concentrations.
In assessing intensity/time responses it was found that the combined solutions gave longer aftertaste than did caffeine alone. Also persistence is more affected by the presence of ethanol than intensity.

Although not significantly, intensity and duration were augmented with the higher level of alcohol.

It is suggested that sensations elicited by strong concentrations of either caffeine or ethanol might be closely related perceptually.

Keywords Gustation - bitterness caffeine ethanol taste intensity duration trigeminal sensation

INTRODUCTION

The literature on alcohol-caffeine interactions has been mainly centered on behavioral and physiological studies in humans and animals.
As it was noted before the majority of psychophysical and physiological papers have focused on the effect of alcohol in the caffeine contained in beverages and foods (Dahl et al. 1997) and when a single bitter compound was used it was mainly quinine (Martin & Pangborn 1970, Cowart 1987, Mattes and DiMeglio 2001). Working with this compound it has been observed that ethanol increases the intensity as well as the duration of the of the bitter taste. (Noble 1990, Noble 1999; Fischer & Noble 1994).
Considering that there is a vast number of inorganic and organic bitter taste compounds (See a review in Delwiche 2001) these findings may not generalize to different bitter substances.
In fact, there are psychophysical data showing that different bitter substances produce different taste profiles (McBurney et al 1972), or are differentially perceived across individuals.

Even compounds that belong in the same category of alkaloids like caffeine and quinine show different perceptual responses. For instance a threshold value of quinine sulfate in water is about 100 times lower than that for caffeine (Pfaffmann 1959, Keast and Roper 2007) and tasted at same concentration is almost 100 times more bitter than caffeine (Lee 1971) On the contrary caffeine gives a longer aftertaste and shorter time to maximum intensity. (Leach and Noble 1986).

Furthermore caffeine possesses a unique bitter taste that, to date, has not been replicated using any other bitter compounds (Allison et al 2000)

On the other hand, ethanol involves chemosensory properties like sweet and bitter tastes and olfaction as well as chemesthetic sensations like numbness, stinging, burning and irritation,

Since we are dealing here with interactions between the two most extensively used psychoactive compounds we believed it was important to examine further the potential changes produced in the taste of caffeine when mixed with ethanol.